

APD LightBox Thermal Measurements

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The thermal stackup:

1. Heat sink with temp controlled water
2. Thermal grease
3. TE Tech TE-31-1.0-2.0P cooler.
4. Berquist 0.040 compression pad
5. Fake APD/ RTD sensor
6. PCB – 4003 material
7. Standard long cookie with fiber bosses in place

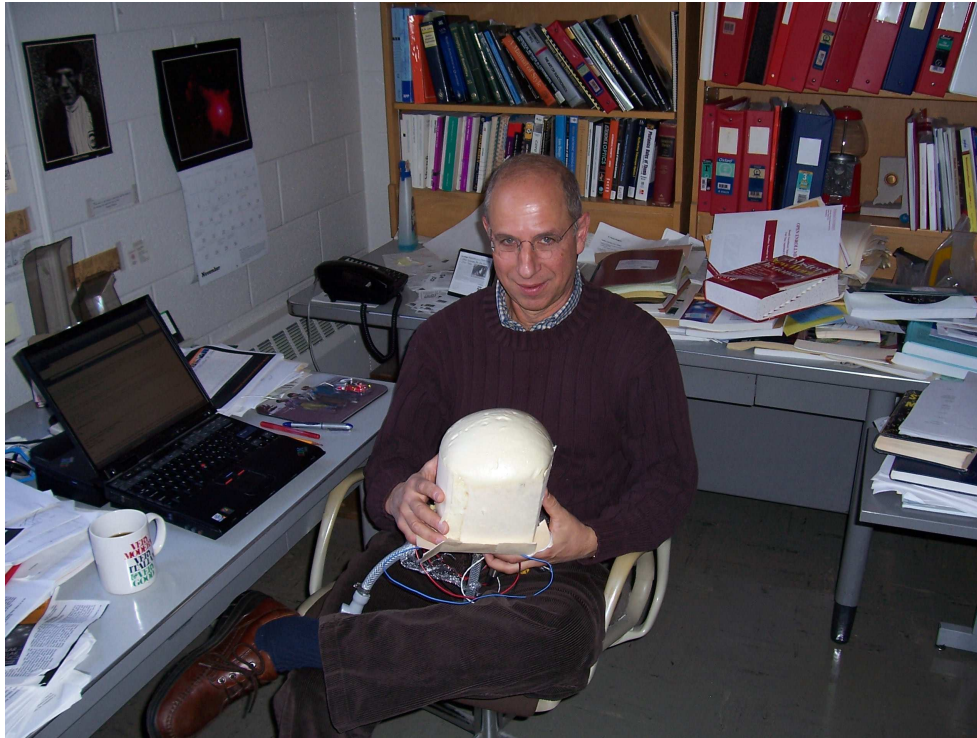
“After a long talk with Paul Lau of TE Technology we came to the conclusion the TE cooler I'm currently using has a partial failure. I_{max} is too high and V_{max} is too low. I've not included the numbers this week to avoid confusion.” Brice

Mounting: Lau mentioned ‘standard’ mounting pressure would be 200 psi. The mounting instructions:

11. Screw the assembly together. Use stainless steel screws, fiber insulating shoulder washers, and steel spring washers. For assemblies with more than two screws, start tightening the screws located in the center of the plate and work outward. Bolt carefully, by applying torque in small increments, alternating between screws. Use a torque-limiting screwdriver. The recommended compression for the thermoelectric module or modules is 1030 kPa to 2070 kPa.

= 10-20 atm = 150-300 lbs/sq in !

Also attached is the image of the "insulated" test setup.



Without insulation: $\Delta_{\max} T = 36.1 \text{ C}$

With insulation: $\Delta_{\max} T = 31.6 \text{ C}$

When Brice tried to split it he discovered the outer 1" had become foam and the inner 3" was a very very sticky gel. This may explain why the numbers were worse in the insulated version.